

PETER B. LYONS NOMINATION

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED TWELFTH CONGRESS
FIRST SESSION
TO
CONSIDER THE NOMINATION OF PETER B. LYONS, TO BE AN
ASSISTANT SECRETARY OF ENERGY (NUCLEAR ENERGY)

MARCH 8, 2011



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PETER B. LYONS NOMINATION

TUESDAY, MARCH 8, 2011

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 10:02 a.m. in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. OK, why don't we get started? The committee meets this morning to consider the nomination of Pete Lyons, to be the Assistant Secretary of Energy for Nuclear Energy.

Dr. Lyons is no stranger to this committee. He served as Senator Domenici's Science Advisor for 6 years and as a professional staff member on the committee staff for 2 years after that.

Nor is he a stranger to nuclear energy issues. He holds a doctorate in Nuclear Physics. He worked at Los Alamos National Laboratory for 28 years. He served as a member of the Nuclear Regulatory Commission for four and a half years.

Moreover he's already well acquainted with the office to which he has been nominated. He's been the principle Deputy Assistant Secretary for Nuclear Energy since 2009. He has served as the Acting Assistant Secretary for Nuclear Energy since last November.

In addition to all that he's from New Mexico which is a major factor in his favor. I think the President made an excellent choice in nominating Dr. Lyons as he is superbly well qualified. I strongly support his nomination. I'm delighted to welcome him here this morning.

Let me call on Senator Murkowski for any statement she wants to make.

STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. Thank you, Mr. Chairman. Good morning. Good morning to you, Dr. Lyons. I'm pleased to have you with us here this morning. I join with the chairman's comments in my support of you.

Senator Domenici was just mentioned here, as well as your background and your relationship with him. He is disappointed he couldn't be here today to introduce you. But he asked me to read the following statement.

Mr. Chairman, if I may read this into the record, it is as follows.

"Mr. Chairman, ranking member, members of the committee, thank you for allowing me to be heard on the nomination of Dr. Pete Lyons, as Assistant Secretary of Energy for Nuclear Energy in absentia. I want to assure Pete and everyone else that if I could be with you today, I would be there with bells on. It's a rare privilege to recommend to the committee today the approval of this nomination.

To Pete, I want to say I have known you more than 20 years as a world class scientist at Los Alamos National Laboratory, as an elected local official and as a valued advisor. I have been truly fortunate to have had you by my side.

To the committee, I say that it is rare indeed that we get a nominee of such exceptional qualifications and with such a record of service to his country. Rarely can we say, I recommend this nominee without the slightest doubt that he is deserving of your enthusiastic, favorable endorsement. You have his resume before you so I won't bore you with the details you already know.

I will note for the record, however, that when Pete Lyons talks about nuclear technology, nuclear non-proliferation and nuclear weapons, everyone in any room in the world pays attention. He simply is one of the best in a discipline critical to America's energy and international security. America is lucky to have someone like Pete Lyons, who is willing to continue to serve his country in such a critical capacity."

That's Senator Domenici's statement. I whole-heartedly agree with that statement. I really don't think that I can add much, Dr. Lyons, other than to say that I too, appreciate your willingness to serve in this capacity.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much.

The rules of the committee that apply to all nominees require they be sworn in connection with their testimony.

Could you please stand and raise your right hand?

Do you solemnly swear that the testimony you're about to give to the Senate Committee on Energy and Natural Resources shall be the truth, the whole truth and nothing but the truth?

Mr. LYONS. I do.

The CHAIRMAN. Please be seated.

Before you begin your statement let me ask 3 questions that we address to each nominee who comes before this committee.

First question is will you be available to appear before this committee and other congressional committees to represent departmental positions and to respond to issues of concern to the Congress?

Mr. LYONS. I will.

The CHAIRMAN. Second question. Are you aware of any personal holdings, investments or interest that could constitute a conflict of interest or create the appearance of such a conflict should you be confirmed and assume the office to which you've been nominated by the President?

Mr. LYONS. My investments, personal holdings and other interests have been reviewed both by myself and the appropriate ethics counselors within the Federal Government. I've taken appropriate

action to avoid any conflicts of interest. There are no conflicts of interest or appearances thereof to my knowledge.

The CHAIRMAN. Very good. Let me ask the third and final question.

Are you involved or do you have any assets that are held in a blind trust?

Mr. LYONS. No, sir.

The CHAIRMAN. Alright. At this point our habit is to invite you to introduce any family members that you have with you, if you do have any?

Mr. LYONS. Thank you, Senator. My son, David is here, also well known in your office. David.

The CHAIRMAN. We welcome David to the hearing as well. At this point why don't you go ahead with any statement that you've prepared to give to the committee, Dr. Lyons?

**STATEMENT OF PETER B. LYONS, NOMINEE TO BE AN
ASSISTANT SECRETARY OF ENERGY (NUCLEAR ENERGY)**

Mr. LYONS. Thank you.

Chairman Bingaman, Ranking Member Murkowski and distinguished members of the committee, it's an honor and a privilege to appear before you today as President Obama's nominee for Assistant Secretary for Nuclear Energy within the Department of Energy. It's a special honor for me to appear before this committee. I worked with members and staff of this committee for 8 years while I was in Senator Domenici's personal office and later when I served on the staff of this committee.

I originally came to the Senate on a detail from Los Alamos National Lab where I'd worked for nearly 30 years. In 2005 I was nominated to the NRC where I served until my term ended in June of 2009. In August 2009 I was honored to accept a request from the Administration to join the Department of Energy as Principle Deputy to Assistant Secretary Dr. Pete Miller, again in the Office of Nuclear Energy. It's been a pleasure. It's been an honor to work with Secretary Chu, Deputy Secretary Dan Poneman, Assistant Secretary Miller and the dedicated team at the department.

The President has clearly articulated his goal of a clean energy future. Has emphasized that nuclear power must be a significant component of that future. In order to reach this clean energy future nuclear energy technologies must be carefully evaluated to enable the public, the Congress and the utility industry to select the best energy options for our Nation.

Last year, Dr. Miller and I worked to develop the Nuclear Energy R and D Roadmap. A document that I believe will guide the American public and the department for many years into the future. In that roadmap we focused on 4 objectives around which our entire program is organized.

Those objectives are to develop technologies to improve the reliability, sustain the safety and extend the life of current reactors.

Second, to develop improvements in the affordability of new reactors to enable nuclear energy to help meet the Administration's energy security and climate change goals.

Third, to develop sustainable fuel cycles.

Fourth, to understand and minimize the risks of nuclear proliferation and terrorism.

The corresponding R and D programs in our recently released Fiscal Year 2012 budget request reflect those objectives.

My experience for almost 5 years as an NRC Commissioner and now for a year and a half in a leadership role with the Department's Office of Nuclear Energy provides a foundation on which, if confirmed, I believe I can continue to serve the Nation in the field of nuclear energy.

While the NRC and the Department of Energy have distinctly different roles they also have important similarities. They share 2 sides of the same fundamental goal to enable safe, secure use of nuclear power for the United States. The NRC has the regulatory focus and responsibility. While the DOE has the research development and deployment focus. But there are times when it is appropriate for the 2 organizations to work together while carefully respecting the responsibilities of each.

I regard my time at Los Alamos, on Senate staff, at the NRC, 42 years in total, as contributions to our national security. Over those years and through many different venues and roles I've worked to try to make our Nation stronger, safer, cleaner, more competitive and more secure. My desire to continue to serve after those years, if confirmed is simple to explain. I want an even better world for my children and my grandchildren.

Thank you and I look forward to addressing your questions.
[The prepared statement of Mr. Lyons follows:]

PREPARED STATEMENT OF PETER B. LYONS, NOMINEE TO BE AN ASSISTANT
SECRETARY OF ENERGY (NUCLEAR ENERGY)

Chairman Bingaman, Ranking Member Murkowski, and distinguished Members of the Committee, it is an honor and a privilege to appear before you today as President Obama's nominee for Assistant Secretary for Nuclear Energy within the Department of Energy.

It is a special honor for me to appear before this Committee. I worked with the Members and staff of this Committee for eight years while I was in Senator Domenici's personal office, and later when I served on the staff of this Committee. I originally came to the Senate on a detail from Los Alamos National Laboratory, where I worked for nearly 30 years.

In 2005, I was nominated to the Nuclear Regulatory Commission (NRC), where I served until my term ended in June of 2009. At the NRC, I focused on the safety of operating nuclear reactors and on the importance of learning from operating experience, even as new reactor licensing and possible construction emerged. My work emphasized that NRC and its licensees remain strong and vigilant components of the Nation's integrated defenses against terrorism. I was a consistent voice for improving partnerships with international regulatory agencies. I also emphasized active and forward-looking research programs to support sound regulatory decisions, address current issues and anticipate future ones.

In August of 2009, I was honored to accept a request from the Administration to join the Department of Energy as principal deputy to Assistant Secretary, Dr. Pete Miller, in the Office of Nuclear Energy. It's been a pleasure to work with Secretary Chu, Deputy Secretary Dan Poneman, Assistant Secretary Miller, and the dedicated team at the Department. Working together, I think we've made some tremendous strides in the past two years, including the award of the first conditional loan guarantee for a new nuclear reactor project from the Department's Loan Programs Office—a program authorized by this Committee in 2005.

The President has clearly articulated his goal of a clean energy future and has emphasized that nuclear power must be a significant component of that future. In order to reach this clean energy future, nuclear energy technologies must be carefully evaluated to enable the public, Congress, and the utility industry to select the best energy options for our nation.

Last year, Dr. Miller and I worked to develop the Nuclear Energy R&D Roadmap, a document that I believe will guide the American public and the Department for many years into the future. In that Roadmap, we focused on four objectives, around which our entire program is organized. Those objectives are to:

1. Develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors.
2. Develop improvements in the affordability of new reactors to enable nuclear energy to help meet the Administration's energy security and climate change goals.
3. Develop sustainable nuclear fuel cycles.
4. Understand and minimize the risks of nuclear proliferation and terrorism.

The corresponding R&D programs in our recently-released fiscal year 2012 budget request reflect these objectives.

There is one new program in particular that I would like to highlight—small modular reactors (SMRs). We first proposed the SMR program in FY2011 and we have expanded the proposal in the FY2012 budget request. Secretary Chu penned an op-ed in the Wall Street Journal last year where he laid out some of the reasons why we are so excited about the prospect of small modular reactors. It's no secret that large reactors face significant financing challenges. But if we can reduce the capital-at-risk with small reactors, and if the reactors can be built in factory settings, with forgings done here in the United States, and shipped to plant sites where they are essentially plugged in, that could offer advantages from a number of perspectives. As a result, we have proposed a Light Water Reactor SMR Licensing Technical Support program that is a near-term, multi-year initiative focused on cost-sharing for first-of-a-kind engineering associated with design certification and licensing activities. We think this program can accelerate the availability of SMRs to help meet the nation's need for low-carbon power, and provide an American-made platform for U.S. companies to export reactors and compete in the international marketplace.

A second, innovative Nuclear Energy program highlighted in the President's recent State of the Union address is the creation of a nuclear energy "hub". The nuclear energy Hub will be the first time a working nuclear reactor has been simulated using modern computational tools. I am very excited about the prospects for the Hub. Last year, we announced the winning team for the Hub, headed by Oak Ridge National Laboratory, and this May we will have the ribbon-cutting ceremony for the opening of their new collaboration site. Simulations of both existing and future nuclear reactors hold great promise for further optimizing the U.S. nuclear fleet.

Turning to the back end of the nuclear fuel cycle, a little over a year ago, Secretary Chu announced the formation of the Blue Ribbon Commission (BRC) on America's Nuclear Future to study and make recommendations on management of used nuclear fuel. The BRC has traveled around the United States, as well as to other countries that have had greater success in moving forward with a disposition path for nuclear waste. The Commission is due to release its interim report around the middle of this year. If confirmed, one of my highest priorities will be to tackle this critical set of issues.

My experience for almost five years as an NRC Commissioner and now for a year and a half in a leadership role with the Department's Office of Nuclear Energy provides a strong foundation on which, if confirmed, I believe I can continue to serve the nation in the field of nuclear energy. While the Nuclear Regulatory Commission and the Department of Energy have distinctly different roles, they also have important similarities; they share two sides of the same fundamental goal: to enable safe, secure use of nuclear power for the United States. The NRC has the regulatory focus and responsibility while the DOE has a research, development, and deployment focus. But there are times when it is appropriate for the two organizations to work together, while carefully respecting the responsibilities of each.

I regard my time at Los Alamos, on Senate staff, and at the Nuclear Regulatory Commission—42 years in total—as contributions to our national security. Over those years, through many different venues and roles, I've tried to make our nation stronger, safer, cleaner, more competitive, and more secure. My desire to continue to serve after those years, if confirmed, is simple to explain—I want an even better world for my children and grandchildren.

Thank you and I look forward to addressing your questions.

The CHAIRMAN. Thank you very much.

Let me ask a couple of questions. The Department's fiscal year 2012 budget requests \$67 million for small modular reactor devel-

opment. Last year Senator Murkowski and I introduced a bill to authorize a small modular demonstration program at the Department and we had Senator's Udall and Landrieu and Risch and others co-sponsoring that. It was unanimously reported from the committee.

My question is whether you have had a chance to look at that bill and do you believe enactment of that bill would provide the Department with useful authority in developing small modular reactors?

Mr. LYONS. Senator Bingaman, we certainly very much appreciate the interest and support from the committee for small modular reactors. Our level of enthusiasm at the Department is very high. This was reflected in an editorial that Secretary Chu penned for the Wall Street Journal within the last few months on this subject.

We regard SMRs as providing at least the possibility of an important new paradigm for nuclear energy possibilities within the United States. We look forward to the opportunities that would be enabled by the FY12 budget to move ahead with a multiyear, competitive, cost share program to evaluate the small modular reactors.

The CHAIRMAN. I guess the more specific question though is whether the legislation that we introduced in the last Congress is a useful additional authority to the Department in doing what you would like to do in this area or whether you think you have full authority to do what you want to do without it?

Mr. LYONS. I should probably review the bill again. My memory from last year is that that bill was regarded very favorably and would indeed be of assistance. But I'd like the opportunity to review the current bill as it's introduced.

The CHAIRMAN. Alright. We would appreciate that.

Secretary Chu shut down the Office of Civilian Radioactive Waste Management and transferred the functions of that office to the General Counsel and the Offices of Nuclear Energy and Legacy Management. I guess my first question is what's the role of the Office of Nuclear Energy on nuclear waste at this point?

Mr. LYONS. Within the Office of Nuclear Energy we have a broad research and development program exploring a number of different approaches to the back end of the fuel cycle. I could go into additional detail if you would like. But I might also note that we're, of course, paying great—we are waiting with great interest the report of the Blue Ribbon Commission on America's Nuclear Future.

We anticipate the interim report to be in July of this year. We're very optimistic that that report, both the interim and the final, will provide some very important guidance to the R and D programs that we have within my office.

The CHAIRMAN. Now once that report is issued, the report of this Blue Ribbon Commission, do you expect to propose a new waste management program to Congress based on the recommendations of that report?

Mr. LYONS. Certainly, Senator, we will—we look forward toward studying that report in great detail. There may well be elements of that report that would suggest some changes in our program.

But I think until we see the report it's a little bit premature to say exactly how we would respond.

I can assure you we will be studying that report very, very carefully and with great expectations.

The CHAIRMAN. Alright.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman.

I'd like to ask a couple questions about the nuclear waste fund and the collection of fees. The Nuclear Waste Policy Act expressly identifies Yucca Mountain as the sole permanent repository. It also directs the Secretary to collect or to propose an adjustment of fees if the costs are insufficient to meet the costs of construction of the repository.

So with all that is going on with Yucca, including the attempted withdrawal of the licensed application, do you believe that the fees that have been collected thus far and deposited in the nuclear waste fund are in excess of the amount needed to meet the repository's cost? Is there an adjustment that would be required at this point?

Mr. LYONS. On the specific question, Senator, of collection of the fee. Let me start from the perspective that the Department recognizes that we have a continuing responsibility to provide for the eventual disposition of the used fuel and the defense wastes. With that continuing responsibility I think it is reasonable to expect that there needs to be continuing funding extracted to enable that eventual disposition.

On the specific question of the details of the fee, that's been reviewed by our General Counsel. Their view is that at this point in time there is no basis on which to propose either an increase or a decrease in the fee. So the fee has continued to be collected.

The Department is required to annually review that fee. Again, the General Counsel would be involved in that review.

Senator MURKOWSKI. But what you're saying is that you don't think that the fee needs to be adjusted at this point in time or we're not certain as to whether or not it is appropriate?

Mr. LYONS. The opinions from our General Counsel, and I'm certainly not a lawyer. But as I understand the report of the General Counsel there is no basis to suggest a change. Therefore the fee has continued unchanged.

Senator MURKOWSKI. The contractual obligation to collect the spent nuclear fuel from the individual nuclear plants started back in 1998. Do we know how much the government has paid out for breaching the contract thus far? Do we have a sense as to what that number is?

Mr. LYONS. The most recent number, Senator, that I saw on that was slightly below one billion.

Senator MURKOWSKI. Do we have any information on how many additional cases might be before the Federal court, and what the amount of that liability might be?

Mr. LYONS. The General Counsel has prepared an estimate of future liabilities anticipating an opening of a future repository in 2020. I believe that estimate is about \$15 billion.

As to the details of number of cases, I don't have that information. I think it would perhaps be difficult to obtain given the nature

of the cases and that there tends to be appeals. Again, I'm not a lawyer. But I think it would be difficult to define how many cases are operating at any one time.

Senator MURKOWSKI. So do we have an idea—just even in the ballpark—of how much we anticipate the final tally will be when the government finally takes title of the spent fuel?

Mr. LYONS. Again the General—

Senator MURKOWSKI. About \$16 billion right now between what has been paid and what is anticipated in terms of liability. But do we even have a guess?

Mr. LYONS. That is based on a 2020 repository opening. Again, until we see the Blue Ribbon Commission report, until both the Department and potentially the Congress act on whatever is in that report, I can't speculate on exactly what the future path will be. But the estimate I provided was based on 2020.

Senator MURKOWSKI. OK. Alright.

Let me ask you about the situation with Yucca, recognizing that even with Yucca Mountain off the table we're still going to need a permanent repository for the spent fuel. Do you support an interim storage program to meet the government's contractual obligations, to end these lawsuits?

Mr. LYONS. Senator, at least for the next few months I think we would all be well served to wait for the report of the Blue Ribbon Commission. They may well recommend such an interim storage facility. They may also recommend, I don't know. But they may recommend alternative management systems that might be used to enable whatever suggestions they make.

I think at this point in time given that that interim report will be available before the end of July. I think it behooves all of us to wait, see what they do recommend and then certainly within the Department and within Congress evaluate what the next steps will be.

Senator MURKOWSKI. I think we're all waiting for it. Concerned though, of course, that as we wait these liabilities continue to mount and to accrue. We still don't have that permanent repository.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Franken.

Senator FRANKEN. Thank you, Mr. Chairman. Both the chairman and the ranking member have spoken to a couple of areas that I want to talk to you about. I wanted to ask you to look 20 years down the road and what technologies do you see will be, we will be using to reduce nuclear waste. But it sounds like your answer would be let's wait til July. Right?

Mr. LYONS. As far as the short term, sir. Yes, I would agree on the wait til July. As far as the longer term I indicated we have a robust research program looking at a number of different options.

I can describe that in greater detail and it might provide some answers if you'd like me to go in that direction.

Senator FRANKEN. Sure.

Mr. LYONS. Within options for the back end of the fuel cycle we're looking at three divergent approaches.

One is the once through system which is what we have been on in this country where fuel would be used once in a nuclear reactor. The used fuel would go directly to a repository.

There also has been some research in this country on what we might call a full reprocessing system where there would be multiple reprocessing steps, multiple exposures in different types of reactors to extract the maximum amount of energy from the original fuel.

Senator FRANKEN. I'm sorry but would that be done without producing any kind of fuel that could be used in a proliferation, in nuclear proliferation?

Mr. LYONS. That was going to be my next sentence.

Senator FRANKEN. OK. Sorry.

Mr. LYONS. That concern with full processing is that at least with existing technologies there are significant proliferation concerns to say nothing of significant environmental concerns from the standpoint of different wastes that are produced along the way. So whether it will make sense even with substantial research to ever move toward full reprocessing, I simply don't know at this point in time.

We also are trying to explore a range of possibilities between those 2 divergent options that might involve far less processing of the fuel, avoid proliferation concerns and while not utilizing all of the energy in the fuel use a lot more than we are now.

To put these numbers in perspective the once through system uses about 0.6 percent of the energy content of the fuel. Full reprocessing is 100 percent essentially.

The in the middle stuff, what we're calling modified open cycle we think might get up to 10 to 20 percent utilization but without the complications of full reprocessing. Again, we'll be guided by the Blue Ribbon Commission.

Senator FRANKEN. OK. I was going to ask as the chairman did about modular reactors. How long do you think it might be until they're deployed til we actually have a modular reactor that's working, up and working?

Mr. LYONS. The first thing we have to do is start this cost share program. We're, at the moment, unable to do that until we get out of CR. I think it is still possible to realize operation on the grid in 2020 with a possibility of 2019.

Senator FRANKEN. OK. I just wanted to ask a question about—this was actually brought up to me by a student at the University of Minnesota, Morris. I'm new on this committee, so I haven't been studying nuclear as much as I will be.

Can you tell me what the role of thorium may be and what the thinking is on thorium as a fuel? What the advantages are? What the disadvantages are? What the pros and cons are of thorium?

Mr. LYONS. Might start from the perspective that the first commercial reactor operated in this country at Shippingport was based on thorium fuel. Thorium fuel was extensively evaluated in the early days of the development of nuclear reactors. Thorium is substantially more abundant than uranium. That may present a benefit.

In terms of looking at other attributes of the fuel cycle at least the studies that we have done to date and we have ongoing studies

do not show a dramatic benefit for thorium. There may be slight differences in the waste but they do not appear to be large. In addition while we are certainly interested in continuing to look at thorium as a possibility and particularly a possibility for the future. The fact remains that we have an entire fuel cycle built up around uranium. It would be a dramatic shift and a very costly shift to move on any sort of short time scale to thorium.

But is it interesting? Yes. Some countries, India for example, has large quantities of thorium and virtually no uranium have been extremely interested in the thorium cycle.

Senator FRANKEN. OK.

Mr. LYONS. That's at least a little bit.

Senator FRANKEN. Thank you very much.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Murkowski, did you have any additional questions?

Senator MURKOWSKI. Just one very quickly, Mr. Chairman.

Relating to nuclear workers: we talk a lot about an aging workforce. We haven't seen anything new happen, unfortunately, in nuclear, despite the renaissance that Senator Domenici dreamed of and was certainly working toward. Can you give some kind of an overview of what educational programs your office is engaged in as we try to develop the next generation of nuclear workers?

Mr. LYONS. I thank you, Senator. I too, have been very, very interested in developing the future workforce. There's substantial numbers of retirements anticipated in that workforce. Whether one visits any of the National Laboratories or nuclear power plants far too many have the grey hair that I have.

For those reasons, yes, we have been extremely interested in programs that prepare the future generation. Within the Nuclear Energy Office we have provided up to 20 percent of our R and D funds as grants to universities in a variety of different ways, R and D grants, infrastructure development grants. Over the last 2 years we've provided \$110 million to universities spread across the United States for those programs.

In addition at least through, I hope, this Fiscal Year, we have had a program for scholarships and fellowships. That's called the Integrated University Program. That is a program that asks that we coordinate among the NNSA part of the Department of Energy, the NRC and my office. Each of those 3 entities receive funding for scholarships and fellowships and coordinate the way in which those scholarships and fellowships are awarded.

Within the Office of Nuclear Energy, for example, last year we awarded 110 scholarships and fellowships. Now within the FY12 budget that Integrated University Program is zeroed for my program, for, assuming I'm confirmed, the NNSA Program and the NRC Program. The rationale for that as explained to me is that the Administration believes that there will be ample motivation for students to enter those programs. Having said that, I have spoken frequently in support of all of these programs.

Senator MURKOWSKI. I have a son in college considering where he might want to land. The thing that guides his decisionmaking process is where the jobs are. If a young person doesn't believe that he or she is going to see the activity within the nuclear industry,

that person is going to take his or her energy and talents elsewhere.

I'm concerned that as we try to ramp up and truly build out our nuclear industry, the trained workforce is not timed right. I appreciate the focus that you have given to it. I think that this is something that we clearly need to watch closely.

Mr. LYONS. I very much share your concern that the future workforce is vitally important. Even if your son looks only at the retirements anticipated with the existing nuclear plants there's thousands of jobs available over the next few years. If we can move toward additional construction in this country there will be many more job opportunities.

Senator MURKOWSKI. I'll let him know.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Franken, did you have additional questions?

Senator FRANKEN. No, Mr. Chairman.

The CHAIRMAN. Alright. Pete, thank you very much. Let me just advise members that they will have until 5 o'clock tomorrow afternoon to submit any additional questions for the record.

Then we will hope to act quickly on your nomination and report it to the full Senate. But that will conclude our hearing. Thank you very much.

[Whereupon, at 10:31 a.m., the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

RESPONSES OF PETER B. LYONS TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. The Light Water Reactor SMR Licensing Technical Support program anticipates a cost of \$452 million over five years. Do you expect this program to run longer than five years or do you believe two SMR designs will have made it through the licensing process in that time frame? What role can the Department of Energy play in the licensing process?

Answer. The Department expects the program to run for five years and expects that the two SMR designs will have made it through the most critical steps of the licensing process in that time frame. The Department expects that SMR vendors will have sufficiently learned from interaction with the Nuclear Regulatory Commission (NRC) and that continued support by DOE will not be necessary after the five year program. It is anticipated that industry will have completed its licensing submittals on a schedule that supports completion of NRC design certification, construction, and operating license reviews soon after completion of this program.

The Department plans to work with the NRC and industry to facilitate any changes to the current licensing framework that may be appropriate based on the features and designs of SMRs in general. The Department intends to provide the analytical, computational and experimental resources to support SMR licensing.

Question 2. Could you provide more detail on what types of technologies you expect the new Nuclear Energy Enabling Technologies program to develop and support? Is it necessary to have a new, separate program from the Reactor Concepts and Fuel Cycle programs to achieve these goals?

Answer. The mission of the Nuclear Energy Enabling Technologies (NEET) program is to conduct research and development to deliver crosscutting technologies that directly support and enable the Office of Nuclear Energy's (NE) broad research and development portfolio and to encourage the development of transformative, "outside-the-box" innovations in nuclear energy science and engineering.

The NEET program will conduct crosscutting research and technology development relevant to the various reactor and fuel cycle concepts within the scope of NE research and development (R&D) programs that offer substantially improved economic and safety performance. The NEET program will be able to coordinate efforts on common issues and avoid duplication of efforts in technology development in separate programs. The NEET program is intended to carry out research that is beyond the scope of individual NE R&D programs, lead and coordinate research that is needed by several NE R&D programs, and identify and deliver enabling technologies to achieve critical steps in technology deployment. The activities undertaken in this program complement those within the Reactor Concepts Research Development & Demonstration and the Fuel Cycle R&D programs by providing a mechanism for pursuing broadly applicable R&D in areas that may ultimately benefit specific reactor and/or nuclear fuel concepts. Reactor and fuel cycle designs are currently limited by technologies at the subsystem and component level, and NEET research is aimed at providing new options to the system level designs.

Through coordinated R&D, this program will ensure that resulting technologies and solutions are scalable to individual reactor and fuel cycle applications (e.g., development of high-temperature resistant materials and radiation-hardened electronics, proliferation risk assessment of different nuclear fuel cycle options, etc.). This R&D will ultimately result in lower costs for needed capabilities across NE R&D programs, better use and coordination of expertise and leveraged facilities across the enterprise, and assurance that the best technologies are available for nuclear energy deployments when needed.

Examples of the types of technologies expected in NEET crosscutting areas include the following:

- New, innovative reactor materials concepts for fuel cladding and structural materials well beyond those currently considered by most industrial interests will be explored to provide alloys with improved performance over traditional materials. Improved performance may include a 5- to 10-fold increase in strength, or increased maximum operating temperature by over 200° Celsius (°C), with a service period of at least 80 years.
- Advanced manufacturing technologies that could provide simplified, standardized, and labor-saving outcomes for manufacturing and civil works processes (both technologies and methods) for new nuclear component manufacturing and plant fabrication will be investigated. For example, concrete installation is one of the most costly (up to \$1 million per day) and time-consuming aspects of building a new nuclear power plant. Potentially, the use of high-strength concrete or steel-concrete composite wall construction could significantly reduce construction cost and schedules. Advanced instrumentation and sensors that could: (1) operate in the temperature regimes and harsh environment (e.g., 1000°C gas environment, liquid metals) that preclude the cross-compatibility of existing instrumentation, (2) directly measure primary process parameters that would otherwise be inferred or measured from a distance with a corresponding loss in precision and increase in uncertainty, (3) minimize measurement drift that can support longer intervals between maintenance and service outages, as envisioned for advanced reactors, and (4) include electronics that are, or can be made to be, radiation tolerant due to their proximity to the nuclear reactor core and back end of nuclear fuel cycle process.
- Advanced modeling and simulation tools are being developed that will provide a greater understanding of the long-term performance of fuels both in the reactor during operations and once discharged (useful to regulators, designers, and operators). For example, the Advanced Multi-Physics (AMP) code being developed at the Oak Ridge National Laboratory models fuel at the “pin” level in three dimensions with very high temporal and spatial resolution. The AMP code is presently being considered for use in the virtual reactor model being developed by the Energy Innovation Hub for Modeling & Simulation of Nuclear Reactors.

Question 3. If the United States were to start construction on a nuclear fuel recycling facility today, how long would it take to construct and for how much?

Answer. At present, the Department does not see a need to construct a nuclear fuel recycling facility for the foreseeable future. Instead, the Department is focusing on research and development of advanced technologies which could be used to treat nuclear fuel.

If the current research and development program proceeds as planned, the Department would eventually need to construct a fuel cycle research laboratory capable of receiving, storing, and separating commercial fuel assemblies and remanufacturing. Existing facilities within the United States are not sufficient to conduct these research and development activities. It is premature to estimate the potential cost and schedule for such a facility.

Question 4. What is the Department doing to ensure the scientific data and information gained during the Yucca licensing process is preserved for future repository development?

Answer. DOE currently maintains the approximately 3.65 million electronic documents that comprise the Licensing Support Network (LSN) collection on file servers located in northern Virginia, which are routinely backed up on tape, and are currently searchable and retrievable through an NRC hosted web portal. Once there is a non-appealable final decision and the licensing proceeding is terminated the LSN collection will be archived in a manner that complies with the Federal Records Act and with National Archives and Records Administration (NARA) guidance. NARA is the agency authorized to determine how long records are maintained. The archived LSN collection will be searchable and retrievable. In accordance with the Federal Records Act, DOE submitted a “Request for Records Disposition Authority” (Standard Form 115) to NARA for the LSN collection and is awaiting NARA’s decision on the LSN record disposition schedule.

In addition to the LSN, DOE’s Office of Legacy Management (LM) has been tasked with ensuring that all other technical databases used by the Office of Civilian Radioactive Waste Management (OCRWM) will remain available to support a restart in the licensing process, should that occur. Like the LSN, LM will also maintain these databases until there is a non-appealable order. Even after all appeals have been exhausted, LM will preserve the technical content contained in these databases at the LM storage facilities.

RESPONSES OF PETER B. LYONS TO QUESTIONS FROM SENATOR PORTMAN

Question 1. Do you agree with Secretary Chu's comments in the Senate Budget Committee's hearing on the President's Fiscal Year 2012 budget request for the Department of Energy, on March 2 of this year that supporting a domestic enrichment technology is important for our nation's energy and national security?

Answer. Yes, I agree with Secretary Chu about the importance of a domestic uranium enrichment capacity as a critical element of the fuel cycle for nuclear power reactors. In support of this critical area, the Department has made available \$4 billion in loan guarantees for the deployment of advanced enrichment technology in the United States. In May 2010, AREVA was granted a conditional loan guarantee to construct a centrifuge enrichment facility in Idaho. In addition, USEC, Inc. has publicly announced that the Department is reviewing its application for the American Centrifuge Plant.

Question 2. Do you agree with Secretary Chu's comments in the Senate Budget Committee's hearing on the President's Fiscal Year 2012 budget request for the Department of Energy, on March 2 of this year that having a domestic production capability for tritium is vital to the U.S. arsenal?

Answer. Yes, I agree with Secretary Chu's comments in the Senate Budget Committee hearing earlier this year regarding the importance of a domestic tritium production capability.

Question 3. As you know, I am concerned about the slow pace of deployment of loan guarantees for nuclear energy projects under the federal loan guarantee program. Nuclear power is the only base-load emissions-free option that we have. Due to the scale of the projects, much of the work needed to build the plants will be done domestically; this means jobs and economic development will be created here at home.

The low cost of natural gas, the slow growth of the U.S. economy, and an uncertainty over a future price on carbon are certainly discouraging many companies from making the substantial investment needed to build a traditional nuclear power plant. Yet there is still significant interest in nuclear. The Nuclear Regulatory Commission has received applications for 26 reactors. And the \$18.5 billion that the Department of Energy has available for nuclear projects under the Federal Loan Guarantee Program, while not distributed, is fully prescribed.

While Secretary Chu stressed the need for a Clean Energy Standard to drive market draw for nuclear, it appears to me that if we can just get the loan guarantee program operating efficiently, we could at least get three or four large scale nuclear projects off the ground. In your opinion what steps should the federal government be taking to jumpstart nuclear production capabilities today?

Answer. There are several things that Federal government could do to jumpstart our domestic nuclear energy capability. The administration has requested an additional \$36 billion in loan guarantee authority, which would bring the total amount to \$54.5 billion. That should be enough to help support 6 to 9 new reactors. The Department has also proposed an aggressive small modular reactor (SMR) program that would help accelerate the availability of SMRs for the US market and international markets. Both the larger nuclear reactors, as well as the smaller ones, would enjoy significantly greater attraction from private investors if the federal government were to put into place a mechanism to at least partially account for the external costs associated with fossil fuel use. President Obama's call for a clean energy standard, for example, would go a long way toward jumpstarting nuclear production capabilities.

Question 4. I want to thank you for attending The Ohio Nuclear Taskforce Roundtable on September 27, 2010, in Columbus, Ohio. As you know, the taskforce was a collaboration of stakeholders including: representation from the nuclear power industry, Ohio's major electric utilities, seven universities and community colleges, nuclear supply chain companies, engineering and technology resource organizations, and nongovernmental organizations. They had a unified goal: make economically viable nuclear power a major component of the nation's future energy profile.

One of the report's recommendations was the Department of Energy should conduct an enterprise study on the future market potential of the U.S. nuclear power supply industries. The questions that were to be answered in such a study included: How many power plants will be constructed and over what period of time, what will be the volumes of productions for given products, what are the market niches in which U.S. companies can best compete, what are the trade skills and manufacturing requirements necessary to make a company highly competitive in a particular product group, and what are the costs associated with upgrading to become a nuclear-grade producer? Can you tell me if the Department of Energy moved for-

ward on conducting such a study? Does the Department of Energy have the resources to conduct such a study?

Answer. It was my pleasure to attend the Ohio Nuclear Taskforce Roundtable. I appreciated the opportunity to receive valuable feedback and suggestions on the role of nuclear power as an economically viable component of the nation's future energy profile. The Office of Nuclear Energy (NE) is not currently pursuing an enterprise study on the future market potential of the U.S. nuclear power supply industries, though it is working on similar and related research, such as the market potential for small modular reactors. DOE has adequate resources to conduct such a study, and will evaluate this opportunity within the context of the NE mission and strategic plan.

RESPONSES OF PETER B. LYONS TO QUESTIONS FROM SENATOR BARRASSO

Question 1. Table 8 of the Department's Excess Uranium Management Plan lays out a schedule for uranium transfers, sales, and barter. The schedule follows a "ramp-up" policy that gradually increases to 10 percent of the market in 2013.

Question 1a. Are you aware of this proposed ramp up?

Question 1b. Why is the Department abandoning this schedule?

Question 1c. Why did the Department include Table 8 in the Management Plan if it does not plan to abide by it?

Answer. The Department's 2008 Excess Uranium Inventory Management Plan (Plan) provided guidelines for the management of the Department's excess uranium inventory and clearly stated that it described planned and future projects under consideration, as envisioned in 2008, and might change in the future. The Plan was a 10-year estimate of future sales and transfers, as illustrated in Table 8, and it contained the provision that situations could arise where DOE's actions could change in response to unforeseen developments. Nevertheless, as a result of close coordination among the offices within DOE responsible for the disposition of excess uranium inventories, the Department's total actual transfers, including transfers for accelerated cleanup services and for NNSA's pre-existing commitments, represented a ramp up of 3.0 percent and 5.8 percent of average U.S. reactor demand in 2009 and 2010, respectively. Accordingly, the material actually transferred was significantly below the 10 percent guideline set forth in the Plan. It should be noted that the Secretary's most recent Determination, announced on March 2, 2011, established a clear ceiling on both an annual and a quarterly basis for the amount of uranium that could be transferred for accelerated cleanup services through the third quarter of calendar year 2013.

Question 1d. Will the Department seek any additional barter, transfers, or sales of its excess uranium over the next three years? Does this include barter, transfers, or sales of uranium tails? Does this include agreements to enrich uranium tails?

Answer. At this time, the Secretary has not authorized the Department to make any transfers beyond the planned NNSA transfers to fund the down blending of highly enriched uranium and the transfers to fund the Portsmouth site cleanup work authorized by the March 2, 2011 Secretarial Determination. Depending on programmatic and policy goals and needs, the Department may seek additional transfers, including those associated with the re-enrichment of uranium tails. However, all transfers will be consistent with the policies and guidelines set forth in the Uranium Management Plan and any transfers that fall within the parameters of section 3112(d) of the USEC Privatization Act will be preceded by the requisite market impact analysis and Secretarial Determination that the transfers will not have an adverse material impact on the domestic uranium mining, enrichment, and conversion industries.